1. (original) A method of preventing bone metastases comprising

administering to a subject afflicted with metastatic cancer a therapeutically effective amount

of a M-CSF mutein or mutein product thereby preventing bone loss associated with the

metastatic cancer.

2. (original) A method of treating a subject afflicted with a metastatic

cancer to bone comprising administering to said subject a therapeutically effective amount of

a M-CSF mutein or mutein product thereby reducing the severity of bone loss associated with

the metastatic cancer.

3. (original) The method according to claims 1 or 2 wherein said subject

is a mammal.

4. (original) The method according to claim 3 wherein said mammal is

human.

5. (original) The method according to claim 4 wherein said mutein or

mutein product inhibits the interaction between M-CSF and its receptor (M-CSFR).

6. (original) The method according to claim 5 wherein said M-CSF

mutein or mutein product inhibits osteoclast proliferation and/or differentiation induced by

tumor cells.

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7. (original) The method according to claim 5 wherein the metastatic

cancer is breast, lung, renal, multiple myeloma, thyroid, prostate, adenocarcinoma, blood cell

malignancies, including leukemia and lymphoma; head and neck cancers; gastrointestinal

cancers, including stomach cancer, colon cancer, colorectal cancer, pancreatic cancer, liver

cancer; malignancies of the female genital tract, including ovarian carcinoma, uterine

endometrial cancers and cervical cancer; bladder cancer; brain cancer, including

neuroblastoma; sarcoma, osteosarcoma; and skin cancer, including malignant melanoma or

squamous cell cancer.

8. (original) A method of screening for a M-CSF mutein comprising the

steps of:

a) contacting metastatic tumor cell medium, osteoclasts and a

candidate M-CSF mutein or mutein product;

b) detecting osteoclast formation, proliferation and/or differentiation;

and

c) identifying said candidate as an M-CSF mutein or mutein product if

a decrease in osteoclast formation, proliferation and/or differentiation is detected.

9. (original) The method of claim 8 wherein said metastatic tumor cell

medium includes tumor cells.

10. (original) The method of claim 8 wherein said contacting step (a)

occurs in vivo, said detecting step (b) comprises detecting size and/or number of bone

metastases, and said candidate is identified as a M-CSF mutein or mutein product if a

decrease in size and/or number of bone metastases is detected.

11. (original) The method of claim 8 further comprising the step of determining if said candidate M-CSF mutein or mutein product inhibits interaction between M-CSF and its receptor M-CSFR.

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- 12. (original) A method of identifying a M-CSF mutein or mutein product that can prevent or treat metastatic cancer to bone, comprising the steps of:
- (a) detecting binding of a candidate M-CSF mutein or mutein product to M-CSFR; and
- (b) assaying the ability of said candidate M-CSF mutein or mutein product to prevent or treat metastatic cancer to bone in vitro or in vivo.
- 13. (original) A method of identifying a M-CSF mutein or mutein product that can prevent or treat metastatic cancer to bone, comprising the steps of:
- (a) identifying a candidate M-CSF mutein or mutein product that inhibits the interaction between M-CSF and M-CSFR; and
- (b) assaying the ability of said candidate M-CSF mutein or mutein product to prevent or treat metastatic cancer to bone in vitro or in vivo.
- 14. (original) A method of preventing bone metastases and tumor growth comprising administering to a subject afflicted with metastatic cancer therapeutically effective amounts of M-CSF mutein or mutein product and a therapeutic agent, thereby preventing bone loss associated with the metastatic cancer and preventing tumor growth.
- 15. (original) A method of treating a subject afflicted with a metastatic cancer comprising administering to said subject therapeutically effective amounts of M-CSF mutein or mutein product and a therapeutic agent, thereby reducing the severity of bone loss associated with the metastatic cancer and inhibiting tumor growth.

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16. (original) The method according to claims 14 or 15 wherein said

subject is a mammal.

17. (original) The method according to claim 16 wherein said mammal is

human.

18. (original) The method according to claim 17 wherein said M-CSF

mutein or mutein product inhibits the interaction between M-CSF and its receptor M-CSFR.

19. (original) The method according to claim 18 wherein said M-CSF

mutein or mutein product inhibits osteoclast proliferation and/or differentiation induced by

tumor cells.

20. (original) The methods according to claims 14 or 15 wherein the

therapeutic agent is a bisphosphonate.

21. (original) The method according to claim 20 wherein the bisphonate is

zeledronate, pamidronate, clodronate, etidronate, tilundronate, alendronate, or ibandronate.

22. (original) The methods according to claims 14 or 15 wherin the

therapeutic agent is a chemotherapeutic agent.

23. (original) The method according to claim 22 wherein the subject is

precluded from receiving bisphophonate treatment.

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24. (original) The methods according to claims 14 or 15 wherein the M-

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CSF mutein or mutein product is effective to reduce the dosage of therapeutic agent required

to achieve a therapeutic effect.

25. (original) The methods according to claims 14 or 15 further

comprising the step of administering a non-M-CSF colony stimulating factor, for example G-

CSF.

26. (original) A pharmaceutical composition comprising a M-CSF mutein

or mutein product and a cancer therapeutic agent.

27. (original) A package, vial or container comprising a medicament

comprising an M-CSF mutein or mutein product and instructions that the medicament should

be used in combination with surgery or radiation therapy.

28. (original) A method of preventing or treating metastatic cancer to

bone comprising the steps of administering a M-CSF mutein or mutein product to a subject

and treating said subject with surgery or radiation therapy.

29. (original) A method of treating a subject suffering from a cancer,

wherein the cells comprising said cancer do not secrete M-CSF, comprising the step of

administering a M-CSF mutein or mutein product.

30.-64. (canceled)